

Evaluation of Observation Services for Dehydration and Trends in Complexity of PQI 10 Cases, 2006-2012

Background

In April 2014, AHRQ submitted NQF 0280 – Dehydration Admission Rate (PQI 10) to the Health and Well-Being Steering Committee for maintenance endorsement review. This population-based measure is intended to capture the rate of avoidable or potentially preventable hospitalizations for dehydration. This measure is designed to assess population access to timely, high quality outpatient and public health services (i.e., health care system broadly defined) in a particular geographic area, for the purpose of diagnosing acute illnesses before progressing to inpatient treatment.

One topic discussed by The Health and Well-Being Steering Committee focused on questions about an average 40% decrease in hospitalizations for dehydration over time. One possible explanation was that cases of dehydration are more frequently treated in the observation setting rather than requiring inpatient hospital admission. Stated another way, care for dehydration in the observation setting may be a substitute for care in the inpatient setting. If this is the case, the remaining inpatient hospitalizations for dehydration may consist of those more severely ill, i.e., those whose hospitalizations would not be potentially preventable. We examined trends in observation services for dehydration over a six year period and the relationship between inpatient stays, emergency department visits, and observation services for dehydration.

Data

All analyses were completed using) 2006, 2009 and 2012 data from the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID), State Emergency Department Databases (SEDD) and the State Ambulatory Services Databases (SASD), which includes outpatient services including observation. Analyses were limited to adults, age ≥ 18 years and community, nonrehabilitation hospitals.

Methods

We examined hospital inpatient and observation services data for 2006, 2009, and 2012 from eight states (i.e., Georgia, Iowa, Maine, Minnesota, Rhode Island, South Carolina, Tennessee, West Virginia). These 8 states were chosen based on the completeness of observation data for the time period. As a sensitivity analysis we examined 2009 and 2012 for six additional states (i.e., Washington, Michigan, Nebraska, Illinois, Kansas, Kentucky, and Vermont). These states had adequate observation data for 2009 and 2012, but not for 2006. The time periods were chosen based on availability of data and policy relevance (i.e., 2008 CMS policy expanded observation services reimbursement from three diagnoses to any diagnosis; MedPAC study in 2010).

We used the PQI 10 version 4.5 definition and applied to each databases to determine the rate of dehydration encounters for three mutually exclusive categories: Inpatient, Outpatient Observation and ED without Observation (To provide context for the observation service data, we also applied the definition to emergency department visits without observation services).

Category Descriptions

1. All inpatient (SID). This is the current PQI 10 definition.
2. Emergency Department (ED) without Observation (SEDD). This uses the PQI 10 logic unaltered, but applies that logic to ED data. Dehydration must be in the first listed position, unless gastroenteritis or acute renal failure is in the first listed position and accompanied by a diagnosis of dehydration. Cases with evidence of observation services are excluded. Likewise, ED visits that result in admission are not included in this category.
3. All Outpatient Observation: This category applies the PQI 10 logic in the same manner as in category 2, but to records from the ED databases with evidence of observation services and records in the SASD.

We did evaluate cases with secondary diagnoses of dehydration to determine the impact of diagnosis ordering in the outpatient setting. The data are not presented here because the associated first-listed diagnoses may not be conditions related to potentially preventable hospitalizations. Therefore these data are inconclusive.

Results

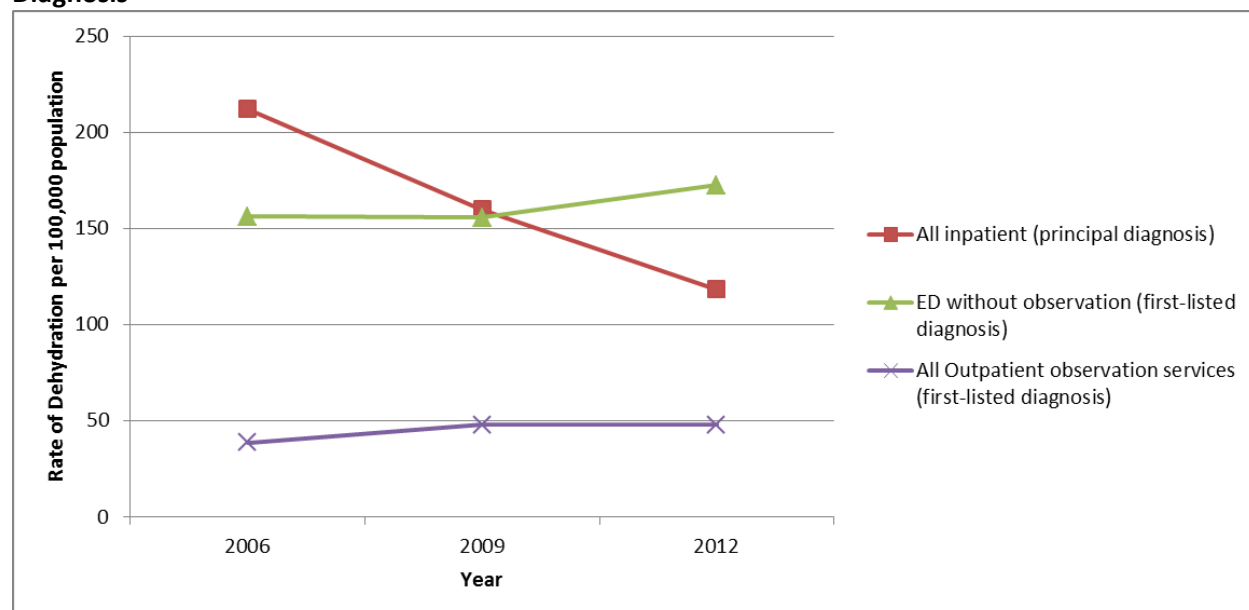
The results of the analysis for 2006-2012 are presented in Figures 1 and 2 and Tables 1 and 2. Cases were divided into the three categories described above: All inpatient, ED without Observation, and All Outpatient Observation Services. We observed a decrease in inpatient hospitalization for dehydration as the principal diagnosis from 2006-2009 (24.5% decrease) and 2009-2012 (26.0% decrease). We observed an increase in observation services with dehydration as a first listed diagnosis from 2006 to 2009 (29.6% increase) and less increase between 2009-2012 (17.7% increase), suggesting a flattening of the trend. However, as figure 2 demonstrates, this increase in observation services does not account for the observed decrease in inpatient admissions for dehydration observed during the same time period. Overall, the total number of encounters for dehydration has decreased, even when including ED visits without observation services. Because of differences in outpatient data as compared to inpatient data, it is difficult to ascertain which observation cases represent substitution for inpatient care. However, we do conclude that there has been fluctuation in population rates of inpatient and outpatient care for dehydration.

Table 1. Rates of Dehydration Related Encounters, 2006, 2009, 2012

	Dehydration encounter rate per 100,000			Percent Change	
	2006	2009	2012	2006-2009	2009-2012
All Inpatient (principal diagnosis)	211.948	159.939	118.372	-24.5%	-26.0%
ED Without Observation (first-listed diagnosis)	156.184	155.54	172.571	-0.4%	10.9%
All Outpatient Observation Services (first-listed diagnosis)	38.568	48.010	47.890	29.6%	17.7%

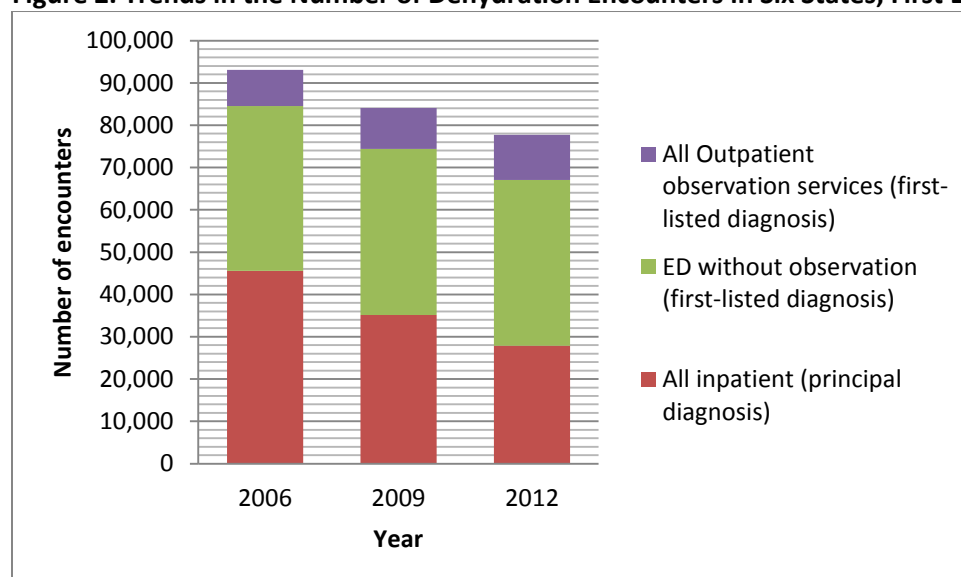
Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project (HCUP), State Inpatient Database (SID), State Emergency Department Databases (SEDD), State Ambulatory Surgery and Services Databases (SASD), Observation Services Data (GA, IA, ME, MN, RI, SC, TN, WV), 2006, 2009 and 2012

Figure 1. Trends in Dehydration Related Encounter Rates (Population Rates per 100,000), First-Listed Diagnosis



Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project (HCUP), State Inpatient Database (SID), State Emergency Department Databases (SEDD), State Ambulatory Surgery and Services Databases (SASD), Observation Services Data (GA, IA, ME, MN, RI, SC, TN, WV), 2006, 2009 and 2012

Figure 2. Trends in the Number of Dehydration Encounters in Six States, First Listed Diagnosis



Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project (HCUP), State Inpatient Database (SID), State Emergency Department Databases (SEDD), State Ambulatory Surgery and Services Databases (SASD), Observation Services Data (GA, IA, ME, MN, RI, SC, TN, WV), 2006, 2009 and 2012

Table 2. Observed Rates of PQI 10 in Inpatient and Outpatient Settings, 2006, 2009, 2012 (GA, IA, ME, MN, RI, SC, TN, WV)

	2006 (GA, IA, ME, MN, RI, SC, TN, WV)		2009 (GA, IA, ME, MN, RI, SC, TN, WV)		2012 (GA, IA, ME, MN, RI, SC, TN, WV)		% change in rate	
	562 counties, Mean population = 42,829		561 counties, Mean population = 44,622		562 counties, Mean population = 45,503		2006 to 2009	2009 to 2012
	No. of Visits	Observed Rate (Median)	No. of Visits	Observed Rate (Median)	No. of Visits	Observed Rate (Median)		
All Inpatient (principal diagnosis)	45,556	211.9	35,147	160.0	27,908	118.3	-24.5%	-26.0%
Emergency Department Only (first-listed diagnosis)	38,990	156.2	39,221	155.5	39,129	172.6	-0.4%	10.9%
All Outpatient Observation Services (first-listed diagnosis)	8,539	38.6	9,691	48.0	10,707	47.9	24.5%	-0.2%
Emergency Department Only (all-listed diagnosis)	109,701	420.3	115,954	470.9	119,677	509.5	12.0%	8.2%
All Outpatient Observation Services (all-listed diagnosis)	22,597	106.8	28,209	138.5	35,170	163.0	29.6%	17.7%

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project (HCUP), State Inpatient Database (SID), State Emergency Department Databases (SEDD), State Ambulatory Services Databases (GA, IA, ME, MN, RI, SC, TN, WV), 2006, 2009 and 2012

In 2006: Number counties = 562, mean population denominator= 42829; 2009: Number counties = 561, mean population denominator= 44622; 2012: Number counties = 562, mean population denominator= 425503

Table 3 shows the correlation between county level observed rates for dehydration for each category. We found that the PQI 10 rates (All Inpatient), is moderately correlated with rates of observation services for dehydration. This moderate correlation suggests that the relationship between inpatient stays for dehydration and outpatient services is not consistent across counties (e.g. counties with low inpatient rates have high rates of observation services for dehydration).

Table 3. Correlation matrix of county level observed rates, 2012

	All Inpatient	All Outpatient Observation	ED with Observation	Observation except ED
All Inpatient	1.000			
All Outpatient Observation	0.497	1.000		
ED with Observation	0.368	0.860	1.000	
Observation except ED	0.380	0.771	0.420	1.000

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project (HCUP), State Inpatient Database (SID), State Emergency Department Databases (SEDD), State Ambulatory Services Databases (GA, IL, IA, KS, KY, ME, MI, MN, NE, RI, SC, TN, VT, WA, WV), 2012

Temporal trends of the complexity of numerator cases

If substitution of observation services is replacing treatment of less complicated cases, we might expect to observe an increase in the complexity of inpatient stays over time.

We examined the complexity of the numerator cases from 2008 – 2012 using three metrics: 1) the percent of discharges with comorbidities can increase the risk of dehydration, 2) the mean number of comorbidities as defined by the AHRQ Comorbidity Index and 3) the mean age in years. The purpose of this analysis is to determine whether as rates of dehydration hospitalizations have decreased over time, the complexity of the remaining numerator cases has increased over time. Each of the three complexity metrics was calculated for each county in the SID; the distribution of the metrics across all counties is provided in Table 4. . We did observe a small (10%) increase in the number of medical comorbidities recorded on the records (mean number was 1.63 in 2008 vs. 1.81 in 2010).

Table 4. Temporal trends in numerator complexity (PQI 10)

	2008		2009		2010		2011		2012	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Percent of discharges with comorbidity ¹										
Heart Failure	11.8%	8.9%	11.7%	9.6%	11.8%	10.0%	12.2%	10.9%	12.1%	10.4%
Diabetes	26.1%	12.7%	26.5%	13.6%	27.1%	13.6%	28.3%	14.7%	28.4%	14.8%
Renal Failure	3.2%	5.9%	3.3%	6.3%	3.4%	5.6%	2.9%	5.3%	2.8%	5.4%
Cancer	13.4%	10.7%	13.7%	11.1%	13.7%	11.9%	13.8%	11.4%	13.9%	13.0%
Mean number comorbidities ¹										
Medical comorbidities	1.63	6.1	1.69	6.5	1.72	6.1	1.78	6.3	1.81	6.3
Behavioral health comorbidities	0.21	0.42	0.22	0.44	0.23	0.43	0.24	0.46	0.25	0.48
Mean age in years										
Mean age in years	67.3	0.13	66.8	0.14	66.7	0.16	67.1	0.16	66.9	0.17

Source: HCUP State Inpatient Databases (SID). Healthcare Cost and Utilization Project (HCUP). 2008-2012.

¹AHRQ Comorbidity Index, version 3.7. Available at <http://www.hcup-us.ahrq.gov/toolssoftware/comorbidity/comorbidity.jsp>

Medical comorbidities included: heart failure, valvular disease, pulmonary circulation disease, hypertension, paralysis, other neurological disorders, chronic pulmonary disease, diabetes without complications, diabetes with chronic complications, hypothyroidism, renal failure, liver, chronic peptic ulcer disease, HIV/AIDS, lymphoma, metastatic cancer, solid tumor, rheumatoid arthritis/collagen vascular diseases, coagulation deficiency. Behavioral health comorbidities included: alcohol abuse, drug abuse, psychoses, depression.